Projected Water Needs in Hardy County

Hardy County is one of the most rapidly developing counties in West Virginia. The growth of new homes and the building of new highways on the eastern half of the county has increased the demand for sustainable water supplies now and in the future. Droughts have also heightened the concern of residents who rely solely on private wells or springs.

This report uses housing and population data to project water uses to the year 2060. Information regarding population changes, housing growth, highway construction, industrial and commercial expansion, and other data provides a basis for projecting growth in the area from now through the Year 2060. (sources: 2000 US Census, 2004 Hardy County Water Resources Report, Appalachian Highway Corridor H Environmental Impact Statement, WVU Bureau of Business Research reports)

There are a couple of alternatives that can be considered when evaluating potential water supply sources. One option is to add water supply to flood prevention impoundments in the Lost River Watershed. The most cost-effective time to add water supply is prior to the construction of a new dam, when a project is still in the planning and design phases. Presently, there are 3 structures already constructed by Potomac Valley Conservation District.

The Town of Wardensville has a small municipal system that relies on a spring that serves town residents. The system is limited and serves a small area of the Lost River Watershed. For the purposes of this projection, it is assumed that future residential and commercial/industrial demand would be served by water sources other than the Wardensville spring.

Residential Demand

The number of housing units has increased about 30% per decade since 1970 in Hardy County (source: US Census Bureau - see table 1). Projecting future water needs in the Lost River Watershed is based on the residential housing growth in Hardy County, and further refined for the geographic area most closely matching the Lost River Watershed (see tables 2 & 3).

Table 1
Housing Growth in Hardy County
1970 to 2000

Year	Housing Units	Percentage Increase	Source
1970	3,311	---	Census Rpt.
1980	4,473	35%	Census Rpt.
1990	5,573	25%	Census Rpt.
2000	7,115	28%	Census Rpt.

Table 2
Housing and Population
Hardy County, Lost River and Capon Census Division
1990 to 2000

Trends over last decade:			
			Percent change 1990-2000
Population	**2000**	**1990**	
Hardy County	12,669	10,977	15%
Lost River Census Division	2,557	2,224	15%
Capon Census Division	2,715	2,288	19%
Housing Units	**2000**	**1990**	
Hardy County	7,115	5,573	28%
Lost River Census Division	1,889	1,340	41%
Capon Census Division	1,627	1,254	30%

Table 3
Portion of County Housing and Population in Projection Area

Using 2000 Census Data:	
Projection area = Lost River Census District and Capon Census District	
Percent of County Total Population within projection area	42%
Percent of County Total Housing within projection area	49%

For the purposes of this report, it is anticipated that some existing homes would switch from private wells/springs to a public water supply source and that all of the new housing growth will be on a public water supply system. In order to determine how many existing residents might switch to public water, the service area demographics were examined for the western side of Hardy County where public water is available. The actual number of residents that would make the change to public water is dependent on many factors including dependability of their existing source and proximity to the transmission lines. Many households could also tap onto public water as a backup in case their wells or springs fail.

Using the Census districts, it can be determined that public water is available to about 4,822 residents in western Hardy County. About 85% of those residents have public water service.[2/]

[2/] Census boundaries for the Moorefield District, the Old Fields District, and a small portion of the South Fork District (about 10% of the geographic area) were used. Population totals for these areas are 2,354, 2,442, and 26 respectfully. Of this population, 4,100 of the 4,822 residents (85%) are public water customers. (source for number of residents served by public water: http://water.usgs.gov/watuse/data/2000/index.html)

Table 4
Projected Residential Need through Year 2060

Year	Housing Units [1/]	Percentage Increase per Decade	Countywide residential Water Need (gpd) [2/ 3/]	Lost River area residential water need (gpd) (49% of the county total)
1970	3,311	---	496,650	230,129
1980	4,473	35%	670,950	328,766
1990	5,573	25%	835,950	409,616
2000	7,115	28%	1,067,250	522,953
2020	12,025	30%	1,803,750	805,413
2040	20,320	30%	3,048,000	1,415,096
2060	34,342	30%	5,151,300	2,445,713

[1/] Housing units from US Census Reports for 1970-2000; 2020-2060 based on 30% growth
[2/] 150 gallons per day (gpd) estimated per household - Hardy County Water Resources Study.
[3/] 1,067 homes deleted from projected public water supply need – 15% stay on groundwater/springs

Commercial & Industrial Demand

Commercial and industrial demand for water is expected to increase in the Lost River Valley as Corridor H opens up access to the region. Some growth will be affiliated with the typical development that occurs at highway exits. Restaurants, overnight lodging, convenience stores and gas stations are predicted to develop at the Corridor H Baker exit. With increased population in the Lost River Valley, there will also be an increase in personal services such as beauty shops, medical offices, and small retail stores. Table 5 shows a likely development scenario in and around the Baker exit of Corridor H. This scenario is used to illustrate the growing need for public water through the year 2060. From a commercial standpoint, this conservative estimate of commercial water needs is limited to the Baker area; however, development will not be limited to the Baker exit and it will not be limited to the businesses identified in Table 5.

Table 5
Water Consumption Rates for Projected Commercial Development

Year	Number of Businesses	Commercial Types	Gallons Per Day	Gallons Per Day Total
2020	4	1 - 20 unit hotel w/ restaurant 1 - 3,000 sq.ft. convenience store 2 fast food restaurants (seat 100 each)	660 249 2000	2,909
2040	10	2 - 20 unit hotels w/ restaurants 2 – 3,000 sq. ft. convenience stores 3 fast food restaurants (seat 100 each) 1 - 5,000 sq. ft. retail establishment 1 3 bay car wash 1 restaurant w/ a bar (seating for 200)	1,320 498 3,000 215 735 4,600	10,368
2060	20	3 – 20 unit hotels w/ restaurants 6 fast food restaurants (seat 100 each) 3 – 5,000 sq. ft. retail establishments 3 restaurants w/ a bar (seating for 600) 1 beauty shop (3 chairs) 1 5,000 sq. ft. grocery store w/ deli 1 light industry w/ shower (25 employees) 2 3,000 sq. ft. medical offices	1,980 6,000 645 13,800 330 405 575 978	24,713

In addition to the projections in Table 5, it is likely there will be growth in the manufacturing and industrial sectors. The most likely industries to seek locations in the Lost River Valley will be those associated with already established industries in the region. Manufactured wood products, poultry processing plants, long term health care facilities, and tourism-based businesses are the most likely to expand or move into the Lost River Valley. Industrial development is anticipated at the Baker Industrial Park and at Wardensville Industrial Park. Water demand projections for larger industries have not been included in Table 6; but, it is recognized that a facility such as a poultry processing plant could use millions of gallons per day, drastically increasing the immediate need for available water.

Table 6
Projected Residential and Commercial Water Demand Through Year 2060

Year	Lost River area commercial water need (gpd)	Lost River area residential water need (gpd)	Total Projected Water Demand	Site 10 supply[1/]	Site 16 supply[1/]	Percent of projected need met by Sites 10 & 16 during extreme drought conditions
2020	2,909	805,413	808,322	600,000	700,000	161%
2040	10,368	1,415,096	1,425,464	600,000	700,000	92%
2060	24,713	2,445,713	2,470,426	600,000	700,000	53%

[1/] Based on safe yield analysis (amount of water available during extreme drought conditions)

Treatment and Transmission Costs for Future Water Supply

Currently, there are no existing water treatment facilities or transmission lines in the project area that would service new water supply sources. Costs for these components will be necessary regardless of the source, thus costs for this component are considered offsetting at this stage of planning.

Conclusion

As previously stated, Hardy County is one of the most rapidly developing counties in West Virginia. The present growth rate indicates a significant need for a dependable water supply. Water supply needs are projected to be 808,300 gpd by Year 2020 and over 2,470,000 gpd by Year 2060. In order to meet the forecasted demand, source water should be identified that will fully or partially meet the short term demand (Year 2020) and will at least partially meet the long term demand (Year 2060). Storage in Site 10 or Site 16 alone will not meet the projected needs in the short term or in the long term; however, storage in both sites together is needed to satisfy the projected short term demand.

The projected long term water demand will not be met by the water available during extreme drought conditions. In order for the region to meet the projected long term demands, additional water supply sources will have to be developed and/or water conservation will have to be implemented during drought conditions. If additional industrial demands that draw large amounts of water become a reality, then additional water sources will be needed regardless of the conservation efforts.